#7/BM
10-25-02

Atty. Docket: IP-6084

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Wadood Hamad et al. : Group Art Unit: 1731

Serial No.: 09/838,463 : Examiner: Alvo, M.S.

Filed: April 19, 2001

Title: METHOD FOR MANUFACTURING PAPER AND PAPERBOARD USING FRACTURE TOUGHNESS MEASUREMENT

Hon. Commissioner of Patents & Trademarks
Washington, D.C. 20231

AMENDMENT

Sir:

In response to the Office Action dated June 12, 2002 in the above-referenced patent application, the Applicants submit the following argument.

ARGUMENT

In the office action, claims 10, 11, 13-15, 17, 19, 20 and 23 were rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,013,403 to Chase in view of any of three articles by Seth. The Applicants traverse this ground for rejection for the following reasons.

In support of the rejection, the Examiner asserts that Chase teaches using empirical methods and techniques of regression analysis to determine functional relationships between material properties and the strength of paper. The Examiner further asserts that Seth "teaches that fractional toughness measurements can be used to determine the strength

of paper. From this, the Examiner concludes that it would be obvious to employ regression analysis to determine functional relationships between material properties and fracture toughness.

To establish a prima facie case of obviousness, three basic criteria must be met by the Examiner, as set forth at MPEP 706.02(j). First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the combined prior art references must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. Applicants apply these criteria below to show that the Examiner has failed to establish a prima facie case of obviousness. Thus, the rejection based on Chase and Seth should be withdrawn.

In the first place, the Examiner's statement of the reasons for rejecting claims 10 and 17 ignores specific claim limitations and does not treat each rejected claim separately. This is contrary to the rules of patent examining procedure. In particular, the Examiner's asserts that "[I]t would have been obvious that the regression analyses to determine functional relationships between material properties . . .

could be related to the fracture toughness . . .". However, neither independent claim 10 nor 17 recites this limitation. Later in the same paragraph on page 2 of the office action, the Examiner points to Chase "for monitoring the variables after a grade is identified and then providing output signals to control the strength or the fracture toughness". The significance of this statement vis-a-vis claims 10 and 17 is again lost on the Applicants since neither claim recites "providing output signals to control . . . the fracture toughness". In fact, nowhere in the office action does the examiner refer or cite to any limitation in claim 10 or 17, and nowhere does the Examiner seek to read the explicit language of claim 10 or 17 on the cited prior art (Chase and Seth). It is well settled that "[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). MPEP 2143.03 further states: "When evaluating claims for obviousness under 35 U.S.C. 103, all the limitations of the claims must be considered and given weight, ...". This the Examiner has not done. Accordingly, the Examiner has failed to state any basis for rejecting claim 10 or 17 (or claims 11 and 13-15 dependent on claim 10) and the rejection must be withdrawn with respect to those claims.

Furthermore, the Examiner has failed to establish any motivation for combining the Chase and Hart teachings for the reason that their teachings are incompatible and not

combinable. Clearly, a person skilled in the art cannot be motivated to do what is not doable. Seth teaches a method of measuring the fracture toughness by performing a test that causes fracture. Chase teaches a method for predicting the strength of a material based on the measurement of certain underlying proxies during the papermaking process. Seth does not teach predicting the fracture toughness by measuring various proxy parameters. Therefore, it should be apparent that the direct measurement technique of Seth could not be incorporated in the monitoring process of Chase. Seth's fracture toughness measurement technique requires destruction of a paper sample, while Chase technique requires non-destructive monitoring of various proxies for the paper strength. Thus, the Examiner has not established any motivation for combining the non-combinable teachings of Chase and Seth. Consequently, the rejection of claims 10, 11, 13-15, 17, 19, 20 and 23 under 35 U.S.C. § 103(a) is deficient.

Furthermore, the Examiner has failed to meet his burden with respect to the third and last criterion: reasonable expectation of success. The mere fact that Chase teaches a regression equation for Mullen burst strength does not establish or imply that the same can be done for fracture toughness. The Examiner has failed to point to any prior art showing that fracture toughness is susceptible to regression analysis. One cannot draw any inferences regarding fracture

toughness of a paper or paperboard product based on its Mullen burst strength.

The Examiner's assertion that "Seth teaches that fractional toughness measurements can be used to determine the strength of paper" is, at best, a tautology, and at worst, a mistake, depending on in what sense the term "strength" is being used. There are many different "strength" properties. To the extent that fractional toughness may be considered a strength property, then indeed the examiner is tautologically correct that Seth teaches that fracture [not "fractional"] toughness measurements are a measure of "strength". However, if the Examiner means that fractional toughness measurements can be used to determine some <u>other</u> strength property of paper, such as tensile strength, then the Examiner is completely mistaken. Fracture toughness is an inherent or intrinsic material property and therefore is independent of other inherent material properties. Fracture toughness cannot be inferred from, for example, ultimate tensile strength and *vice versa*.

While Seth teaches the measurement of an intrinsic material property, namely, fracture toughness, Chase teaches the prediction of a material property, namely Mullen burst strength, that is <u>not</u> an intrinsic material property. Bronkhorst and Bennett, in their monograph "Deformation and Failure Behavior of Paper," in: Handbook of Physical Testing, Volume 1, 2nd Edition, R. E. Mark et al., p. 380, state:

"Understanding the significance of the burst test results is difficult because of the complex stress and strain fields present in the test specimen. It is likely that bursting strength is related to tensile strength, tensile strain, and shear characteristics of the material. Because the burst results depend on so many variables, the burst strength is not an intrinsic material property." (Emphasis added.)

Thus the Examiner has not established that it would be obvious to apply regression analysis to fracture toughness. Claim 19 recites a method for designing a grade of paper or paperboard, comprising the steps of performing a factorial experiment to investigate the effects of papermaking variables on in-plane fracture toughness and then analyzing the acquired data to derive a statistically significant model for fracture toughness as a function of a plurality of material properties of the grade of paper or paperboard. Neither Seth nor Chase disclose or suggest that a statistically significant model for fracture toughness could be acquired in this way.

In summary, the Examiner has not satisfied any of the three criteria for a prima facie showing of obviousness: motivation to combine the prior art teachings, reasonable expectation of success; and a prior art combination having all limitations of each rejected claim. Accordingly, the rejection of claims 10, 11, 13-15, 17, 19, 20 and 23 should be withdrawn.

The examiner has also rejected claims 12, 16, 18, 21 and 24 as being obvious over Chase in view of Seth, and further in view of U.S. Patent No. 3,490,689 to Hart et al. The Applicants traverse this ground for rejection for the following reasons.

The Hart et al. reference discloses the control of a machine system, e.g., papermaking, via a combination of sensors. The examiner cites Hart for teaching "automatic control of a paper machine" and for teaching the addition of a "filler", namely, alum. However, alum is not used as a filler in papermaking. Typically, filler is PCC (precipitated calcium carbonate). Alum is typically added for retention, whereas PCC is added to fill up the sheet, hence use less fibers.

In any event, even if alum were a filler, the examiner's proposed combination of Hart with Chase would not be obvious. The Chase patent clearly shows in Figure 7 the properties to be measured under the column labeled MEASUREMENT. The measurement of the level of filler does not appear as one of the measurements to be taken. That circumstance is probably due to the fact that Chase is interested in only two categories of paper strength properties: (1) properties <u>inherent in fibers</u> and (2) properties <u>inherent to structural arrangements of fibers</u>. Thus, Chase would have no motivation to measure the level of filler since nothing in Chase indicates that filler level impacts the strength properties of interest to Chase.

Consequently, it would not have been obvious at the time of Applicant's invention to import filler measurement from Hart into the teaching of Chase.

With respect to rejected claims 16 and 24, the Applicants respectfully point out that the examiner has cited no prior art reference showing a mathematical model for the fracture toughness of paper. Such a formula is recited in rejected claims 16 and 24. The examiner does not assert that this formula or anything similar is disclosed in Chase, Seth, Hart or any other reference. In fact, there is nothing obvious about Applicant's mathematical model.

The Examiner's assertion (on page 4 of the action) that Applicants' specific equations are "routine calculations of the functional relationships of the measured values and would have been obvious to an engineer given the teachings of" Chase and Seth is groundless if not ludicrous. The Applicants (not the cited prior art) disclosed what factors (fiber furnish, filler, etc.) need to be taken into account for creating the new, improved product, and have presented a mathematical model that governs performance predictions, in terms of fracture toughness, as a function of basic papermaking variables (fiber furnish, filler, etc.). The Applicants submit that it was not obvious to a person skilled in the art what the mathematic model for fracture toughness of paper would be. In fact, the Applicants included voluminous experimental data (see the tables in the Appendices) from

numerous experiments that were conducted. Only after extensive data acquisition were the Applicants able to derive the rigorous structure-property-performance mathematical relationship disclosed in claimed in the instant application. This empirically derived mathematical model is in no way obvious from the prior art cited by the examiner. This is evidenced by the curious lack, in the office action, of any citation to particular extracts of the prior art showing why it was obvious that filler level, softwood pulp content and caliper would necessarily be the three decisive factors in a regression equation for fracture toughness.

In view of the foregoing, the rejection of claims 12, 16, 18, 21 and 24 should be withdrawn.

Finally, in the action the examiner rejected claim 22 as being obvious over Chase in view of Seth, and further in view of the article by Page et al. The Applicants traverse this ground for rejection for the following reasons.

Claim 22 depends from claim 20, which in turn depends from claim 19. As already argued, claim 19 is patentable over the combination of Chase and Seth because neither reference discloses or suggests deriving a mathematical model of fracture toughness of a grade of paper or paperboard as a function of a plurality of material properties of that product. Nor does the Page et al. article contain such a teaching. Claim 22 is patentable over the combination of Chase,

Seth and Page at least for the same reasons, set forth above, that claim 19 is patentable.

In view of the foregoing, the Applicants submit that all pending claims are in condition for allowance. Reconsideration of the application and allowance of claims 10-24 are hereby requested.

Respectfully submitted,

October 15, 2002
Date

Dennis M. Flaherty
Reg. No. 31,159
Ostrager Chong & Flaherty LLP
825 Third Avenue, 30th Floor
New York, NY 10022-7519
Tel. No.: 212-826-6565

CERTIFICATE OF MAILING

The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on the date set forth below.

October 15, 2002
Date

Dennis M. Flaherty

1731

$

Atty Docket No.: IP-6084

Applicants: Wadood Hamad et al.

Group Art Unit: 1731

Serial No.: 09/838,463

Examiner: Alvo, M.S.

Filed: April 19, 2001

Date: October 15, 2002

Title: METHOD FOR MANUFACTURING PAPER AND PAPERBOARD USING FRACTURE TOUGHNESS MEASUREMENT

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

TRANSMITTAL LETTER

Sir:

Transmitted herewith for filing in the above-identified application is an Amendment.

FEE FOR ADDITIONAL CLAIMS

_X_ A fee for additional claims is not required.
___ A fee for additional claims is required. The additional fee has been calculated as shown below:

	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		NUMBER OF EXTRA CLAIMS	RATE	ADDITIONAL FEE
TOTAL CLAIMS:	15	-	24	=	0	x $18 =	0
INDEPENDENT CLAIMS:	3	-	4	=	0	x $84 =	0
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM						+ $280 =	0
						TOTAL FEE DUE $	0

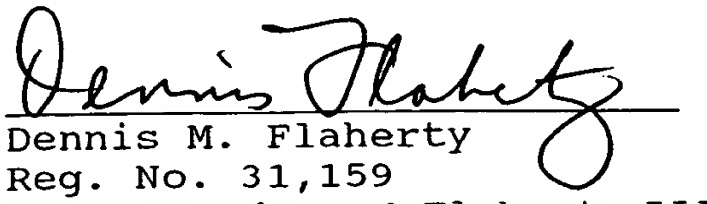
_X_ Our check for payment of the required fee for a one-month extension of time, in the amount of $ 110.00, is enclosed.

___ Please charge $_____ to Deposit Account No. 15-0699 in payment of the fee.

_X_ The Commissioner is authorized to charge payment of any extension or other fee under 37 CFR 1.16 or 1.17 which may be required by this paper or credit any overpayment of same to Deposit Account No. 15-0699.

Respectfully submitted,

Attorneys for Applicants



Dennis M. Flaherty
Reg. No. 31,159
Ostrager Chong & Flaherty LLP
825 Third Avenue, 30th Floor
New York, NY 10022-7519
(212) 826-6565